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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/671,930
Filing Date: September 26, 2003
Appellant(s): BONNE ET AL.

John G. Shudy, Jr.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed March 28, 2008 appealing from the Office action mailed October 17, 2007.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

a. Claims 1-2, 5-6, 22-24 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonne et al. (U.S. Patent No. 6,393,894).

Bonne discloses a fluid sensor comprising a concentrator (Fig. 6 part 124); a separator connected to the concentrator (Fig. 6 part 126); a phased heater array having a first plurality of heating elements situated in the concentrator (Fig. 7 parts 168a-d) and a heating element situated in the separator (Fig. 7 part 170); a ratio control mechanism (Fig. 7 part 180) for changing the ratio of concentrator heating elements relative to separator heating elements (Fig. 8); the ratio control mechanism and the controller connects to the phased heater array (Fig. 7) and a first detector connected to the separator (Fig. 7 part 164). Figure 8 shows that the ratio control mechanism (part 180) and the controller (part 130) change the ratio of active concentrator heater elements to separator heating elements from 1:1 to 0:1. A micro discharge mechanism is located proximate to the first detector (Fig. 9 outlet below part 264; column 4 lines 14-19) and connected to the controller (Fig. 9). It is inherent that the sensor in Bonne comprises a processor connected to the detector as the detector cannot be read without one. Since a processor is inherently connected to the detector, it is also connected to the

concentrator, separator, micro discharge mechanism and anything else connected directly or indirectly to the detector. It is also inherent that the processor comprises switches and control logic. A controller (Fig. 6 part 130) is connected to the concentrator and separator and is capable of changing the ratio of concentrator heating elements to the separator heater element (Fig. 8). The concentrator may be a pre-concentrator as there may be an unlimited number of phased heater arrays (Fig. 8). The heater elements apply heat in a sequential phased manner to the concentrator (Fig. 3). The detector may be a thermal-conductivity detector (Fig. 6 part 128). A flow sensor is connected to the concentrator (Fig. 8; column 7 lines 19-30).

Bonne does not expressly disclose a plurality of heater elements in the separator. *In re Harza* 274 F.2d 669, 124 USPQ 378 (CCPA 1960) teaches that it is well settled that mere duplication of parts has no patentable significance unless a new and unexpected result is produced. The prior art of *In re Harza* taught one rib whereas the claims at issue claimed a plurality of ribs. Id. at 381. In the instant case, Bonne teaches a single heater element in the separator whereas Applicant claims a plurality of heater elements. Bonne teaches that the separator heater element separates the constituent gasses into individual constituent components. The expected result of providing a plurality of heater elements is a more precise separation of the components. Therefore, it would have been obvious to one of ordinary skill in the art to increase the number of heater elements in the separator in order to have a more precise separation of components in the gas. In addition, it would have been obvious to one of ordinary

skill in the art to plan how the concentrator and separator heating elements are to be arranged in the sensor prior to building it.

Furthermore, Bonne does not expressly teach a fluid sensor comprising a plurality of concentrator heater elements corresponding to a plurality of separator heater elements. The number of heater elements used by one of ordinary skill in the art is a result-effective variable. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) teaches that optimization of a result-effective variable is ordinarily within the skill of one in the art. The number of separator heater elements is an art-recognized result-effective variable. A result-effective variable is one that has well-known and expected results. It is well known in the analytical arts that adding an additional means for separating provides a more precise separation of selected components in a mixture. Bonne teaches that the separator heating elements separate selected constituents into individual components (claim 14). In light of this knowledge, the number of separating means used can be modified to optimize the desired level of separation. Thus, additional separator heating elements would provide a more precise separation of selected constituents.

Varying the number of either concentrator or separator heater elements has the well-known and expected result of varying the final concentration and/or level of separation of the desired compound or molecule. Bonne teaches concentrator heating elements and teaches that "any number of downstream [concentrator heating] elements may be heated …to produce an even further increased concentration level at the output of the concentrator" (Column 3 lines 13-17). Bonne further teaches that "in a preferred

embodiment, there are between one hundred and one thousand heater elements spaced along channel 250" (column 9 lines 1-3).

It would have been obvious to one of ordinary skill in the art to meet the number of heating elements required in claim 22 by modifying Bonne and selecting the number of concentrator and separator in order to obtain the desired concentration of the desired compound. Thus, it would have been obvious to have a corresponding number of concentrator and separator heater elements when the corresponding number obtained the desired concentration and separation of the desired compound.

b. Claims 3-4, 8-10 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonne et al. (U.S. Patent No. 6,393,894) in view of Kubisiak et al. (U.S. Patent No. 6,169,965).

Bonne does not disclose a second detector or a flow sensor. Nor does Bonne teach a processor on a separate board from the concentrator, separator and phased heater array.

With regard to claims **3-4,** Kubisiak discloses a detector 210 (Fig. 4) and a flow sensor 222 (Fig. 4), both connected to a processor 430 (column 9 lines 43-53; Fig. 9) comprising switches (Fig 9) and control logic (column 10 lines 10-13). Detector 210 is used to measure fluid properties (column 7 lines 43-45), whereas 222 is used as a flow sensor (Column 7 lines 49-50). Kubisiak teaches that the flow sensor may be located upstream or downstream of the heating element (column 8 lines 61-65). An advantage of using the Kubisiak system is that the processor 430 uses the data from the heater

and the sensors to determine phase lags between the signals as well as fluid properties such as pressure or temperature. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Bonne sensor structure with the teachings of using processor and switches of Kubisiak in order to control the timing of the activation of the different heating elements and to gain the additional advantage of determining the phase lag and fluid properties.

With respect to claims **8-10 and 25-27**, Bonne does not teach a sensor wherein the concentrator, separator and phased heating elements are on a separate board from the processor. Kubisiak discloses a system in which the heaters and sensors are on a board separate from, but connected via wire bonds to, a board containing the processor, switches and control logic. While it appears that Kubisiak does not separate the heating elements from the processor, it would have been obvious to one or ordinary skill in the art to make separate the heaters from the processor to prevent overheating of the processor.

(10) Response to Argument

A. Claims 1-2, 5-6, 22-24 and 28-30 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bonne et al. (U.S. Patent No. 6,393,894).

a. *Independent claim 1*

i. Appellants argue that Bonne does not teach a phased heater array wherein "the concentrator heating elements and separator heating elements are in a pre-arranged pattern" since Bonne teaches only a single

heating element. Appellants also argue that Bonne does not provide motivation or suggestion for adding additional heating elements in a pre-arranged pattern with the concentrator heating elements.

As stated in the above rejection, the examiner agrees that Bonne teaches a single heating element and thus does not expressly teach more than one heating element. Examiner explains in the rejection in view of Bonne, and repeats this argument below, that it would have been obvious for one of ordinary skill in the art to modify Bonne by adding an additional separator heating element. The Examiner disagrees with Appellants' assertion regarding Bonne's lack of motivation. In determining obviousness, neither the particular motivation to make the claimed invention nor the problem the inventor is solving controls. MPEP § 2141. Factors other than the disclosures of the cited prior art may provide a basis for concluding that it would have been obvious to one of ordinary skill in the art to bridge the gap. MPEP § 2141. When making a rejection under 35 U.S.C. § 103, an examiner must articulate a reason or rationale to support the obviousness rejection. KSR, 550 U.S. at ___, 82 USPQ2d at 1396. The Examiner has articulated a rationale to support the obviousness rejection and repeats it here. The Examiner argues that it would have been obvious for one of ordinary skill in the art to modify Bonne by multiplying the number of separator heating elements for multiplied effect. *In re Harza* 274 F.2d 669, 124 USPQ 378 (CCPA 1960) teaches that it is well settled that mere duplication of parts has no patentable significance unless a new and unexpected result is produced. The prior art of *In re Harza* taught one rib whereas the claims at issue claimed a plurality of ribs. Id. at 381.

In the instant case, Bonne teaches a single heater element in the separator whereas Appellants claim a plurality of heater elements. Bonne teaches that the separator heater element separates the constituent gasses into one or more individual selected constituent components (column 3 lines 18-21). Thus, the effect of duplicating the separation heater element of Bonne by adding at least one additional separation heater element would be to separate more selected constituents. An alternate effect of duplicating the separation heater element would be to enable a more precise separation of selected constituents. Either one of these effects provides the motivation for duplicating the separation heater element for multiplied effect. It would have been obvious for one of ordinary skill in the art to modify Bonne by duplicating the separation heater element in order to gain the advantages of either separating more selected constituents or to enable a more precise separation of selected constituents.

Regarding the "pre-arranged pattern" in which the concentrator heating elements and the separator heating elements are claimed, it is inherent that during the development of a new invention of a phased heater array, a design of the phased heater array will be made. As part of the design process, a pre-pattern is inherently designed. Bonne in Figures 1, 2 and 6-9 teaches a pre-arranged pattern of concentrator heating elements and one separator heating element. Thus, it would have been obvious to one of ordinary skill in the art to plan how the concentrator and separator heating elements are to be arranged in the sensor prior to building it, thus pre-arranging the pattern of concentrator and separator heating elements. At the time that one of ordinary skill in the art decided to add separator heating elements to multiply

the effect of the separation heater element, it would have been obvious for that person with ordinary skill to pre-arrange the pattern of concentrator heating elements and separator heating elements.

ii. Appellants argue that mere duplication of parts does not result in the claimed sensor because Bonne lacks a plurality of heating elements and a ratio control mechanism. Appellants disagree with Examiner's assertion that Bonne teaches a ratio control mechanism.

As argued above, the Examiner finds that general knowledge in the art provides the motivation to modify Bonne from a heater array with a single separator heating element to one with a plurality of separator heating elements. And as stated in the rejection, the Examiner finds that Bonne teaches a ratio control mechanism. Along the same lines as the ratio control mechanism teaching, Boone teaches changing a ratio of active concentrator heater elements to active separator heating elements from 1:1 to 0:1. The Examiner gleaned this reading of Boone from Figure 8 in light of Figure 7. Figure 7 shows the heater control logic blocks 180 and 166 connected to the heaters of the concentrator and separator. Figure 8 shows the activation of each heater in the concentrator represented by bumps in the horizontal line (parts 194, 198 and 200). The activation of the separation heater is designated by bump 196. When one bump shows up on one of the horizontal lines for heaters 1-3, the ratio of activation of concentrator to separator is 1:1 at that timepoint. When no bump appears, i.e. the space between bumps 194 and 198, the ratio of activation of concentrator to separator heater elements

is 0:1, as no heater in the concentrator is activated. In summary, Figure 8 shows a ratio of activation of concentrator to separator heater elements of 0:1 and 1:1 and Figure 7 show the ratio control mechanism that controls that action.

Because Bonne teaches a ratio control mechanism and because it would be obvious for one of ordinary skill in the art to modify Bonne by adding at least one separator heating element, a mere duplication of parts does result in the claimed sensor.

iii. Appellants argue that the plurality of heating elements is not a mere duplicate as the claimed device provides versatility by allowing the ratio of concentrator heating elements relative to separator heating elements to be changed.

The prior art Bonne discloses changing the ratio of concentrator heating elements relative to separator heating elements. As argued above, it would have been obvious for one of ordinary skill in the art to modify Bonne by adding at least one additional separator heating element. Also as argued above, Bonne teaches a ratio of activation of concentrator heating element to separator heating element as either 1:1 or 0:1. These ratios read on the claim language and therefore demonstrate that the plurality of separator heating elements is a mere duplicate.

iv. Appellants argue that 1) Bonne does not teach a number of separator heating elements corresponding to the number of concentrator

heating elements and 2) the prior art does not recognize the number of separator heater elements as a result-effective variable.

These arguments do not relate to the claim language of claim 1, but instead relate to claim 22 and will be addressed below.

v. Appellants argue that there is no motivation for one of ordinary skill in the art to modify the controller to control a ratio of a plurality of concentrator and separator heating elements in a pre-arranged pattern.

No claim language claims the controller controls the ratio in a pre-arranged pattern, thus this argument is outside the scope of the claims.

b. *Independent Claim 22*

vi. Appellants argue that because that the prior art does not recognize the number of separator heater elements as a result-effective variable, Bonne does not teach or provide any suggestion or motivation for one of ordinary skill in the art to add a number of separator heating elements corresponding to the number of concentrator heating elements.

The number of separator heater elements is an art-recognized result-effective variable. A result-effective variable is one that has well-known and expected results. It is well known in the analytical arts that adding an additional means for separating

provides a more precise separation of selected components in a mixture. In light of this knowledge, the number of separating means used can be modified to optimize the desired level of separation. Bonne teaches that the separator heating elements separate selected constituents into individual components (claim 14). Thus, additional separator heating elements would provide a more precise separation of selected constituents.

Varying the number of either separator or concentrator heater elements has the well-known and expected result of varying the final concentration and level of separation of the desired compound or molecule. Bonne teaches concentrator heating elements and teaches that "any number of downstream [concentrator heating] elements may be heated …to produce an even further increased concentration level at the output of the concentrator" (Column 3 lines 13-17). Bonne further teaches that "in a preferred embodiment, there are between one hundred and one thousand heater elements spaced along channel 250" (column 9 lines 1-3).

It would have been obvious to one of ordinary skill in the art to meet the number of heating elements required in claim 22 by modifying Bonne and selecting the number of concentrator and separator in order to obtain the desired concentration of the desired compound. Thus, it would have been obvious to have a corresponding number of separator and concentrator heater elements when the corresponding number obtained the desired concentration and separation of the desired compound.

vii. Appellants argue that the Examiner's stated motivation for having a corresponding number of separator and concentrator heating elements is not the apparent objective and function of the Bonne device.

That the Examiner's motivation appears to differ from the disclosures of Bonne does not demonstrate a gap in the Examiner's basis for concluding that it would have been obvious to one of ordinary skill in the art. In determining obviousness, neither the particular motivation to make the claimed invention nor the problem the inventor is solving controls. MPEP § 2141. Factors other than the disclosures of the cited prior art may provide a basis for concluding that it would have been obvious to one of ordinary skill in the art to bridge the gap. MPEP § 2141. Office personnel may take into account "the inferences and creative steps that a person of ordinary skill in the art would employ." KSR, 550 U.S. at ___, 82 USPQ2d at 1396. In addition to the Graham factors, Office personnel may rely on their own technical expertise to describe the knowledge and skills of a person of ordinary skill in the art. MPEP § 2141. When making a rejection under 35 U.S.C. § 103, an examiner must articulate a reason or rationale to support the obviousness rejection. KSR, 550 U.S. at ___, 82 USPQ2d at 1396. The Examiner has met the burden for demonstrating obviousness by relying on a motivation that takes into account the inferences and creative steps that a person of ordinary skill in the art would employ and has articulated this rationale. That the Examiner's motivation appears to differ from the disclosures of Bonne does not demonstrate a gap in the Examiner's basis for concluding that it would have been obvious to one of ordinary skill in the art.

c. The Micro Discharge Mechanism

Appellants disagree with Examiner's assertion that Bonne teaches a micro discharge mechanism. Examiner has cited the outlet in Figure 9 located below part 264. The referenced outlet is a micro discharge mechanism because it is microscopic in size, actively discharges the fluid from the chip and is located next to the detector part 272. Bonne's cited Column 4 lines 14-19 explain that the chip is microscopic. Further support can be found in Figure 1, which shows entry port 34 and exhaust port 36. Parts 34 and 36 appear to be the corresponding parts to Figure 9's channel input mechanism part 250 and channel discharge mechanism (the hole just below part 264). Webster's II New Riverside Dictionary (1996) defines a mechanism as "a means or process by which something is done or brought into being." The outlet port in Figure 9 just below part 264 is a mechanism because it is the means by which the separated constituents are delivered to the detector.

B. Claims 3,4,8-10 and 25-27 are patentable under 35 U.S.C. § 103(a) over Bonne et al. (U.S. Patent No. 6,393,894) in view of Kubisiak et al. (U.S. Patent No. 6,169,965).

i. Claims 3,4,8-10 and 25-27

Appellants argue that the rejection under Kubisiak does not make up for what Bonne allegedly lacks. The Examiner asserts that there is no need for Kubisiak to make up for what Bonne lacks as the rejection under Bonne demonstrates that the instantly

claimed invention would have been obvious to one of ordinary skill in the art at the time of invention.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Examiner, Art Unit 1797

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